

WHAT IS CLAIMED IS:

1. A method of making an oxidation protective multiple coating for a carbon/carbon composite, the method comprising:

(a) forming an initial coating layer on the carbon/carbon composite by a pack cementation process;

(b) coating Si over the initial coating layer to form an Si-coated carbon/carbon composite; and

(c) heat-treating the Si-coated carbon/carbon composite to impregnate the initial coating layer, and cracks in the initial coating layer, with Si;

thereby forming an SiC layer and an Si layer.

2. The method of claim 1, further comprising oxidizing the Si layer to form an SiO₂ film.

3. The method of claim 1, wherein a vehicle liquid is used to facilitate the coating of Si over the initial coating layer in (b).

4. The method of claim 3, wherein the vehicle liquid is a volatile alcohol.

5. The method of claim 1, wherein the heat-treating in (c) is performed at a temperature of about 1400 °C to about 1600 °C under a pressure of about 10 mTorr to about 1000 mTorr.

6. The method of claim 2, wherein the oxidizing of the Si layer is performed at a temperature of about 400 °C to about 800 °C.

7. A coated carbon/carbon composite made according to the method of claim 1.

8. A coated carbon/carbon composite made according to the method of claim 2.